DISSERTATION ON

ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN COMMON SURGICAL CONDITIONS

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CERTIFICATE

This is to certify that this dissertation entitled "**ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN COMMON SURGICAL CONDITIONS**" is the bonafide record work done by **Dr.V.PRABAKAR,** submitted as partial fulfillment for the requirements of M.S. Degree Examinations Branch I – General Surgery, March-2007.

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CONTENTS

INTRODUCTION

FNAC remains the first choice for the initial investigation and diagnosis of both superficial and deep lesions though core needle biopsy is extremely valuable in selected cases.

Clinical value of FNAC is not only limited to neoplastic conditions, but also valuable in the diagnosis of inflammatory, infectious and degenerative conditions.

It is relatively painless, produces a speedy result and cheap. Its accuracy in many situations can approach that of histopathology in providing an unequivocal diagnosis in the experienced hands. It is applicable to lesions that are easily palpable.

The risk of needle tract seedling is extremely low when truly fine needles of 22 gauge or less are used.

The success of FNAC depends on representativeness and adequacy of sample and high quality of preparation.

At the community level, FNAC may be regarded as simple screening test for serious disease, which needs further investigation and referral to specialist.

In the major hospital, it is an essential component of the final preoperative or pretreatment investigations on which the management of the problem is based.

“There would be so little danger in extracting a small quantity of tissue from an obscure growth by the aid of a needle, trocar or cannula, so little substance is there necessary for the microscope that the diagnosis of cancer would no longer be embracing or vogue.”

VELPEAU 1856

HISTORICAL DEVELOPEMENT

At about the sametime histopathologist and cytologist began their tentative initiatives, Leyden and 3years later, Menetrier employed needles to obtain cells and tissue fragments.

In the UK in 1927, Dudgeon and Patrick proposed the needling of tumors as a means of rapid microscopic diagnosis.

Similarly Martin and Ellis at memorial hospital in USA were also advocates of needle aspiration.

In Europe particularly Scandinavia FNAC as the technique began to flourish in 1950s and 1960s.

Abulkasim, an Arabian physician, in 10^{th} century was credited for using the technique. Dating back to 1904, when Greig and Gray aspirated a lymphonode to diagnose Trypanosomiasis, the clinical use of aspiration cytology was introduced for the first time in the history. Fine

needle aspiration cytology has been used in Sweden since 1950. It does not supplement histology but augments it.

The earlier microscopist like Malphiggi and Virchow looked at scrappings and fluids under microscope and described their findings.

In 1858, Rudolf Virchow, published his cellular physiology, Ward in 1912, used FNAC to examine lymphnode for lymphoma.

Guthrie in 1921 first used lymphnode aspiration on a systematic basis.

In 1957 Gibson and Smith published their report on FNAC. At the Radium hemmet in Stockholm about 12000 aspirations were performed every year, 2000 on thyroid alone. Other centers using this technique on a large scale are the “Harzen Institute of Oncology” in Moscow and the Curie foundation at Paris.

A current authoritative view on FNAC of thyroid Neoplasm has been published by Lowhagen et al 1979 and Chu et al 1979.

There is a large body of world literature attesting to its accuracy and advantages, although the need for caution in interpretation, meticulous attention to the technique and the limitations of diagnosis are also well documented.

Of the many workers it was Johannes Muller who set the foundation of clinical cytology. In 1938 he published on the nature and structural characteristic of cancer and those morbid growth that may be confended with it.

In most hospital in UK the aspirations are performed by the clinicians, who send slides directly to the laboratory. As the equipment needed for FNAC is minimal, it can be performed in the clinic, ward or even in the patients home. In most cases, definite answer can be given and if a cytological diagnosis of malignant cell is made, histological confirmation prior to definite treatment is not required. On the other hand, a report of “No malignant cells seen” doesnot excludes cancer. If there is any doubt in the mind of the cytologist it is indicated so in the report and a formal biopsy of frozen section is performed. A positive result is significant. Whereas a negative result may not be so.

Seedling of tumour cells along fine needle tract is virtually unknown. Presently FNAC is routinely done in many centers also in India. With further advance, the accuracy rate has been increased with the analysis of DNA content of the aspirates and correlation of cytology examination with DNA analysis offers unique opportunity to obtain an accurate diagnosis in thyroid neoplasms (Atkin N.B: Br.J.Cancer 40:210 – 221, 1979)

AIM OF THIS DISSERTATION

The aim of this dissertation is to evaluate the accuracy of fine needle aspiration cytology to diagnose common surgical conditions in consecutive 200 cases.

Correlation of FNAC results with postoperative Histopathological reports.

Analysis of sensitivity and false positive results of FNAC in common surgical conditions like

1. Salivary gland tumours.
2. Lymphnode swellings.
3. Thyroid gland swellings.
4. Breast lumps.
5. Soft tissue swellings.

MATERIALS, METHODS AND TECHNIQUE

MATERIALS

1. Disposable (Gamma-irradiated)hypodermic needles of size 23 and of length between 1 to 11/2 inches.

2. Disposable sterile 5 ml syringe. Pistol syringe holder (Cameco Syringes) is preferred. But here it's not used.

3. Swabs with spirit (or) skin sterlising solutions.

4. Several 76 x 26 mm size microscope slides are suitably labeled and numbered with suitable instrument.

5. Koplin – Jar for keeping the smeared slides in the fixative, the fixative being Isopropyl alcohol.

6. Small transport box for slide preparations in which the specimen slides are held separately so that the face of the slide is not damaged and not contaminated during transportation.

7. Complete laboratory request form with full clinical details.

8. Stain: Hematoxylin and Eosin stains

SAMPLE TECHNIQUE

The skin is cleaned and the lump is located and firmly held between the thumb and the fore finger of the free hand. The syringe is held by outside of the barrel and the needle tip is pushed into the lesion vertically. The plunger is partially retracted, creating a negative pressure, without loosing the pressure or pulling the needle tip out of skin, the whole syringe is rotated by the movement of the wrist and gently moved in and out. The cutting edge of the needle tip frees the cells inside the lesion, which are sucked into the fine bore of the needle.

Using continuous negative pressure by pulling firmly on the plunger of the syringe, guide the cutting tip of the needle forwards and backwards and obliquely through the firmly held lump and twisting the wrist to apply a rotating as well as a forward and backward action, the cells are sucked into the lumen of the needle.

Nothing is usually visible in the body of the syringe between the bottom of the plunger and the needle head, a cyst being an obvious exception.

Now, slowly release the pressure on the plunger so that there is no more suction effect. Withdraw the syringe and the needle gently from the skin. It is important, releasing of the pressure is not performed before removing the needle, air will rush up the needle and loose the specimen into the body of the syringe.

EXPELLING THE BIOPSY MATERIAL:

After the needle is withdrawn from the patient, it is removed from the syringe.The syringe filled with air and the needle is replaced firmly. Some workers using an air reservoir technique is not used here.

The syringe is held vertically with the needle tip above the surface of the microscopic slide, the plunger is pushed down and the contents of the needle are blown gently on the slide or slides.

MAKING OF A SMEAR:

DIRECT SMEAR

When the cells are adequate we can directly make the smear.

INDIRECT SMEAR:

When the cells are inadequate we have to centrifuge the aspirates and then can make the smear.

HEMATOXYLIN AND EOSIN STAINING FOR FNAC OF SWELLINGS.

1. Cellular preparation are made rapidly as described above and with as little trauma to the cells as possible. For fixation, the slides are immersed in 100% Isopropyl alcohol for a minimum of 30 minutes.
2. Then the slides are stained with Haematoxylin for 10minutes.
3. Then, the slides are washed in tap water and differentiated in acid alcohol.
4. Then, the slides are left in running water for blueing

5. The slides are stained with Eosin for 2minutes.

6. Then the slides are washed and dried and mounted.

Two slides are prepared for each case.

When aspirating the thyroid, a vascular organ, a bloody aspirate is sometimes obtained. A technique similar to that of karolinska Institute, Stockholm is used, the syringe contents are emptied quickly on to one or two slides before the blood clots. If there is semisolid material on the slide, the spreader slide is turned over and the flat surface is pressed gently on to those tiny fragments and the slides pulled apart ending up with evenly spaced cells on both slide surfaces.

REVIEW OF LITERATURE

Fine needle aspiration cytology is not the substitute for histopathological examination. It is used in conjunction with clinical and radiological findings to provide best possible initial assessment on which management decisions can be based.

Team work, careful technique and enthsiasm for FNAC are essential factors while actual organization of the work can be modified to suit local conditions.

SALIVARY GLANDS:

Salivary glands are not subjected to incisional or core neelde biopsy because of risk of fistula and in neoplasm for fear of tumour implant

More than 50% of the swellings are Non-neoplastic.

ACCURACY:

From the karolinska study, FNAC accuracy for salivary gland neoplasms are more than 90%.

More than 90% pleomorphic adenoma and most malignant tumours are diagnosed correctly.

In a review in 1994, sensitivity was 81-100%, specificity was 94-100% and accuracy of typing was between 61 and 80%

Heterogenous structure of many salivary gland tumours inevitably limits the accuracy of FNB due to small size and selective character of the sample.

Diagnosis of pleomorphic adenoma and warthins tumour are easy.

False negativity are related to cystic tumours, warthins tumour, mucoepidermiod carcinoma, acinic cell carcinoma etc.

False positive results are related to regenerative epithelial hyperplasia and squamous metaplasia in sialadenitis or warthins.

Hyaline globules in monomorphic adenoma are misdiagnosed as Adenoid cystic carcinoma.

Distinction between primary and metastatic carcinoma is difficult in poorly differentiated carcinoma.

LYMPHNODE:

Commonest cause of peripheral lymphadenopathy is reactive.

Cytological examination can decide whether the lymphadenopathy is due to reactive hyperplasia, metastatic or malignant lymphoma.

Commercially produced monoclonal antibodies to various antigens assists the pathologist in identification of the source of tumour metastasis.

The role in diagnosis of lymphoma is to confirm a clinical suspicion or to exclude with confidence. Cytological diagnosis of NHL is confirmed by open biopsy and histopathological examination for defining diagnosis and subtyping.

Preop FNB does not adversely affect subsequest histological examination of the node.

ACCURACY:

The diagnosis of metastatic malignancy is influenced by size and site of lymph node, fibrosis, previous radiation and number of punctures made.

Diagnostic specificity is high.

The diagnostic accuracy not only depends on representativeness of the aspirate but also on the quality of cytological preparation.

Dignostic sensitivity is significantly lower for lymphoma than metastatic malignancy.

THYROID GLAND:

FNAC is the fistline diagnostic test for evaluation of goiter and single most effective test for preoperative diagnosis of solitary nodule thyroid.

The main indications for FNAC are :

1. Diagnosis of diffuse non-toxic goiter
2. diagnosis of SNT or dominant thyroid nodule
3. confirmation of clinically obvious thyroid malignancy.
4. To obtain material for special laboratory investigations aimed at definite prognostic parameters.

Prevalence of palpable thyroid nodule is about 4% and less than 5% of these nodules are malignant.

FNAC confirms benignity in about 60%. In diffuse non-toxic goiter FNAC distincts between colloid goiter and autoimmune thyroiditis.

FNAC provides a more rapid safe and accurate diagnosis of the SNT. The proportion of malignancy in surgically resected nodules may increase to 40% compared with 8-20% before the use of FNAC.

Confirmation of obvious malignancy, in particular, anaplastic carcinoma and malignant lymphoma, spares the patient additional invasive diagnostic procedures.

ACCURACY:

FNAC is highly accurate in the diagnosis of thyroiditis.

In view of asheroft and vanhale, FNAC is shown to achieve a diagnostic accuracy of over 90% in terms of predictive value, sensitivity, specificity and efficiency in diagnosis of neoplasms.

False negativity in relation to cystic neoplasm, cystic papillary carcinoma is more than 40% .

False negative diagnoses also arise from inadequate samples, geographic misses of the lesion, dual pathology and errors in interpretation.

Repeat FNB Samplings over a period of time reduces the false negative rates.

False Positivity is low, is around 1-3% in malignancy. It is minimal in anaplastic carcinoma or high grade lymphoma.

False negativity is high in very well differentiated follicular carcinoma and Low or intermediate grade lymphoma.

BREAST:

A preoperative diagnosis offers several advantages in a palpable breast lump

1. Immediate diagnosis relieves the patient's anxiety.
2. Definite treatment is planned in advance
3. If cancer is confirmed, Staging investigations can be arranged.
4. Some benign conditions confidently diagnosed and surgery avoided.
5. Need for frozen section diagnosis is reduced.

FNB and mammography as compliments to clinical examination (triple assessment) have become the standard approach to the investigation of palpable breast lumps.

USG is useful in young women

Aspirated cell material can be used for hormone receptor analysis and various quantitative investigations such as morphometry, DNA measurement and cell kinetics.

FNB of a palpable breast lumps should be preceded by mammographic examination as radiological findings may influence the choice of the area to be biopsied.

ACCURACY:

Sensitivity of FNAC in diagnosis of breast carcinoma is 90-95%. The aim is not to be less than 95%

Sensitivity is reduced for invasive lobular carcinoma, smaller and very large cancers and DCIS.

Positive predictive value of a malignancy diagnosis is high.

Best results are achieved if the pathologist who reads the smears, also performs the biopsies.

Insitu carcinoma constitutes special problem since it is impossible to decide if invasion is present or not. High grade and large cell DCIS is easily recognized as malignant in FNB.

Low grade and small cell intraduct carcinomas of papillary or cribriform type may not show an obviously malignant cytological pattern, reported as suspicious or atypical with recommendations for open biopsy.

False negative results is usually less than 5%

Diagnostic accuracy is over 99% in triple assessment.

SUBCUTIS AND SOFT TISSUE:

The use of FNB and cytodiagnosis in the primary evaluation of a mass in the skin, subcutis or soft tissues is still debated.

Pretreatment diagnosis relieves patient's anxiety by providing instant diagnosis, followed by discussion of Therapeutic options.

Subcutaneous lipoma is one of the commonest tumours, on rare occasions have had surprise findings. FNB confirmation is justified in such circumstances.

Present use of FNB as primary and often definite diagnosis of soft tissue tumours before treatment is based on the following.

1. Treatment of majority of soft tissue tumours is surgery. Specific histiogenic type is less important than site, size and relation to Vessels, Nerves and Bone.

2. Essential to accurately identify as benign or malignant and to exclude other malignancies or reactive process.

3. Planning of management is based on the combined evaluation of clinical data, radiological findings and cytological examination.

ACCURACY

Result of FNAC of soft tissue tumours are promising if patients suspected of malignancy are referred to centers specialising in this field.

Akerman et al reported in his series insufficient material is 6% of Specimens, erroneous cytological diagnosis in 5%.

85% benign tumours were reported as benign.

89% of sarcomas reported as malignant soft tissue tumours.

DISORDERS OF SALIVARY GLANDS

There are four main salivary glands and multiple minor salivary glands.

PAROTID TUMOURS:

- Most common is pleomorphic Adenoma (80-90%)
- Low grade malignant tumours cannot be distinguished from benign neoplasms
- High grade tumours grow rapidly are usually painful and often have lymphnode involvement at presentation.
- CT and MRI are useful
- FNAC is better than open biopsy
- Tumours should be excised, not enucleated

CLASSIFICATION

TYPE	SUBGROUP	EXAMPLES
I. Adenoma	Pleomorphic Monomorphic	PleomorphicAdenoma Warthin's tumour
II.Carcinoma	Low grade	Acinic cell carcinoma Adenoid cystic carcinoma low grade mucoepidermoid carcinoma.
	High grade	Adenocarcinoma Squamous cell carcinoma High grade mucoepidermoid carcinoma
III. Non-epithelial tumours		Hemangioma Lymphagioma
IV. Lymphomas	Primary	Non-Hodgkin's
	Secondary	Lymphoma in Sjogren Syndrome
V.Secondary tumours	Local Distant	Head and Neck tumours skin and bronchus
VI. Unclassified		
VII. Tumour like lesions	Solid	Adenomatoid hyperplasia, Benign Lymphoepithelial lesion
	Cystic	Salivary gland cysts

TNM STAGING

Tumour:

TX	-	Primary tumour can not be assessed.
T0	-	No evidence of Primary tumour.
Tis	-	Carcinoma insitu.
T1	-	Tumours 2cm or less without extraparenchymal extension.
T2	-	Tumours 2cm – 4cm without extraparenchymal extension.
T3	-	Tumours having extraparenchymal extension without VIIth nerve involvement and/or 4cm-6cm in greatest dimension.
T4	-	Tumours invade base of skull, VIIth nerve and /or >6cm.

Node:

Nx - Regional nodes can not be assessed.

N0 - No regional node metastasis.

N1 - Single ipsilateral node 3cm or less size.

N2 - N2a - Single ipsilateral node 3-6cm size

N2b - Multiple ipsilateral nodes, no more than 6cm size.

N2c - Bilateral or contralateral lymphnodes, no more than 6cm size.

N3 - Metastasis in lymphnode > 6cm size

Metastasis:

Mx - Metastasis can not be assessed

M0 - No distant metastasis

M1 - Distant Metastasis.

THYROID

CLASSIFICATION OF THYROID SWELLINGS:

Simple Goitre (Euthyroid)

Diffuse hyperplastic

Physiological

Pubertal

Pregnancy

Multi Nodular Goitre

Toxic

Diffuse – Grave's

Multinodular

Toxic Adenoma

Neoplastic

Benign

Malignant

Inflammatory:

Autoimmune	-	Chronic Lymphocytic thyroiditis
		Hashimoto's thyroiditis
Granulomatous	-	De Quervain's thyroiditis
Fibrosing	-	Riedel's thyroiditis
Infective	-	Acute (Bacterial, Viral, Subacute)
		Chronic (TB, Syphilitic)
Others	-	Amyloid.

CLASSIFICATION OF HYPOTHYROIDISM

Autoimmune thyroiditis (chronic lymphocytic)

Non-goitrous - primary myxoedema

Goitrous - Hashimoto's

Iatrogenic

After thyroidectomy

After radioiodine theraphy

Drug induced (anti-thyroid, PAS & Iodides in excess)

Dyshormogenesis

Goitrogens

Secondary to pituitary or hypothalamic disease

Thyroid agenesis

Endemic Cretinism

CLASSIFICATION OF THYROID NEOPLASMS:

Benign

- Follicular Adenoma

Malignant

- Primary
  - Follicular epithelium
    - Differentiated – Follicular
      Papillary
    - Undifferentiated – Anaplastic
  - Para follicular cells
    - Medullary
  - Lymphoid cells
    - Lymphoma
- Secondary
  - Metastatic
  - Local infiltration

TNM STAGING OF THYROID CANCER.

Tumour

Tx - Primary can not be assessed

To - No evidence of primary

T1 - Limited to thyroid, ≤ 1cm

T2 - Limited to thyroid , >1cm but <4cm

T3 - Limited to thyroid >4 cm

T4 - Extending beyond capsule, any size

Nodes

Nx - Cannot be assessed

No - No regional node metastasis

N1 - regional node metastasis

Metastasis

Mx - Cannot be assessed

Mo - No metastasis

M1 - metastasis present

BREAST

BENIGN BREAST DISORDERS CLASSIFICATION

ANDI

Cyclical nodularity and mastalgia

Cysts

Fibroadenoma

Duct ectasia/periductal mastitis

Pregnancy related

Galactocele

Puerperal abscess

Congenital disorders

Inverted nipple

Supernumerary breasts/nipples

Non-breast disorders

Tietze's disease

Sebaceous cysts and other skin conditions

Risk of future Invasive breast carcinoma

No increase

Adenosis

Apocrine metaplasia

Cysts, small or large

Mild hyperplasia (>2 but <5 cells deep)

Duct ectasia

Fibroadenoma

Fibrosis

Mastitis, inflammatory

Periductal mastitis

Squamous metaplasia

Slightly increased (RR 1.5-2)

Moderate or florid hyperplasia, Solid or papillary

Duct papilloma with fibrovascular core

Sclerosing adenosis, well-developed

Moderately increased (RR 4-5)

Atypical hyperplasia, ductal or lobular

Foote & Stewart classification for invasive breast cancer:

I. Paget's disease of the nipple

II. Invasive Ductal Carcinoma

- A. Adenocarcinoma with productive fibrosis (80%)
- B. Medullary carcinoma
- C. Mucinous (colloid) carcinoma
- D. Papillary carcinoma
- E. Tubular carcinoma

III. Invasive lobular carcinoma

IV. Rare cancer – Adenoid cystic
Squamous cell
Apocrine

TNM STAGING OF CARCINOMA BREAST

Tumour

Tx - Cannot be assessed

To - No evidence of primary

TIS - Insitu cancer

T1 - Tumour < 2cm

T2 - Tumour 2-5 cm

T3 - Tumour > 5cm

T4 - Any size invading skin or chest wall

Node

Nx - cannot be assessed

No - No regional node metastasis

N1 - mobile Axillary nodes

N2 - Fixed axillary nodes

N3 - Ipsilateral Supraclavicular nodes

Metastasis

Mx - cannot be assessed

Mo - No distant metastasis

M1 - Distant metastasis

SOFT TISSUE SARCOMA

Predisposing factors for sarcomas

- Genetic predisposition
  - Neurofibromatosis
  - Li-Fraumeni syndrome
  - Retinoblastoma
  - Gardner's Syndrome
- Radiation Exposure
  - Ortho and mega Voltage Therapeutic radiation
- Lymphedema
  - Post Surgical
  - Post Irradiation
  - Parasitic infection (Filariasis)

Trauma

Post parturition

Extremity

Chemical

2.3,7,8 – Tetrachlorodibenzodioxin (TCDD)

Polyvinyl Chloride

Hemochromatosis

Arsenic

AJCC staging

Primary tumour (T)

T1 - tumour ≤ 5 cm

T1a - Superficial

T1b -Deep

T2 - Tumour > 5cm

T2a- Superficial

T2b- Deep

Regional Lymph nodes (N)

N0 - No regional nodal metastasis

N1- Regional nodal metastasis

Distant Metastasis

M0- No Distant metastasis

M1- Distant Metastasis

Histological grade (G)

G1 - Well differentiated

G2 - Moderately Differentiated

G3 - Pooly Differentiated

G4 - Undifferentiated

Classification Of Cervical Lymphadenopathy

Inflammatory - Reactive hyperplasia

Infective :

Viral	-	IM, HIV
Bacterial	-	Streptococcus, Staphylococcus
	-	Actinomycosis
	-	TB
	-	Brucellosis
Protozoan	-	Toxoplasmosis

Neoplastic

Malignant	:	Primary – Lymphoma
		Secondary – SCC
		Known Primary
		Occult Primary

OBSERVATION AND RESULTS:

This study was conducted in 200 patients who presented to TMCH with various types of swellings. Out of these 200 patients, males were 40 and Females were 160. As there were more number of breast and thyroid swellings in this study, Females out number the males.

The overall accuracy of FNAC in diagnosis of common surgical conditions from this study was 80%. There were 40 negative FNACs out of theses 200 cases.

Commonest causes for the breast lumps, presented here were, Fibroadenoma in case of benign swellings and Infiltrating ductal carcinoma among malignant varieties. Sensitivity of FNAC for fibroadenoma was 94.4% whereas for IDC it was about 94.5%.

The sensitivity for fibroadenosis was 33.3% and for phylloides tumour was 66.6%.

Among the thyroid tumours, the sensitivity for papillary thyroid carcinoma came to 80%, but for benign swellings like Nodular goiter and Adenoma was 76% & 71% respectively.

FNAC sensitivity of TB adenitis, Lymphoma and metastatic node was 62.5%, 90.9% & 100% respectively. Also reactive nodes were also diagnosed with 100% sensitivity.

Parotid tumours, both benign and malignant, were shown to have FNAC sensitivity of 100%.

Mesenchymal neoplasms were diagnosed with 80% sensitivity. Whereas the lipomas were correctly found out in 100% of patients.

False positivity rate in papillary thyroid carcinoma was 28.5% which is higher than the observation of other studies. In case of Fibro adenoma, it was about 21.7%, whereas no case was reported falsely among Infiltrating ductal carcinoma patients.

One case reported as lymphcyst thyroid turned out to be papillary carcinoma on Histopathological report.

One MNG case was reported as Follicular neoplasm in FNAC.

Three patients who were reported as nodular goiter in FNAC, found to be having Thyroiditis (Autoimmune) from the Histopathology reports.

1.Breast

Age (Years)	Diseases		
	FA	Phylloides	IDC
10-20	22	-	-
21-30	10	1	4
31-40	7	2	13
41-50	-	1	9
>50	-	-	9

2.Thyroid.

Age (Years)	Diseases		
	Adenoma	MNG	PTC
10-20			
21-30	2	10	2
31-40		10	3
41-50	2	5	
>50	2	1	1

3.Lymphnode

Age (Years)	Diseases		
	TB	Lymphoma	Metastasis
<10	1	-	-
11-20	2	3	-
21-30	3	2	-
31-40	-	2	1
41-50	-	2	1
>50	-	4	2

4.Parotid

Age (Years)	Diseases	
	Pleomorphic Adenoma	Carcinoma
10-20		1
21-30	2	2
31-40		2
41-50	1	
>50	2	2

DISCUSSION

The literature sensitivity in the diagnosis of carcinoma breast was 90-95%. In our study it was 94.5% and almost matches the literature sensitivity. The commonest benign swelling of the breast, fibroadenoma, is also diagnosed with sensitivity of 94.4%

Ashcroft & Von Henle achieved a diagnosis of Thyroid neoplasm in accuracy of over 90%. Papillary thyroid carcinoma had accuracy of 80% in this study.

The sensitivity for lymphoma, Tuberculosis & metastasis node were 90.0%, 62.5% & 100% respectively from this study. This almost approaches the recommended values from other studies of 84-98% for lymphoma and 90-96% for metastasis. The study conducted at PGI, Chandigarh showed sensitivity for lymphoma, TB & Metastasis as 64.7%, 60.4% and 71.5% respectively.

Karolinska produced accuracy of more than 90% in neoplasm's of salivary glands. In 1994 reviews, they produced sensitivity of 81-100% and accuracy of typing in 61-80%. Our study results were 100% sensitive to both benign and malignant neoplasms.

The reported sensitivity of 100% for lipoma, 80% for mesenchymal malignancy in this study little bit contrasts the literature results of 85% for benign & 89% for malignant soft tissue tumours.

The less sensitivity of FNA to the diagnosis of Fibrodenosis is due to variable responsiveness of breast tissue portions to hormonal stimuli and cytology taken from unrepresentative fibrous portions.

The false positivity in case of papillary carcinoma & Follicular neoplasm in MNG may be due to papillary & Follicular pattern observed from the follicle lining epithelium, while they are in a

transforming sate of non-toxic to toxic. This can be minimized by careful study of cytological features.

Lymphomas would not be typed from the FNAC, even though it is reported as lymphoproliferative disorder. So it would be better to go for excision biopsy if Lymphoma is suspected.

CONCLUSION

1. FNAC is highly sensitive in diagnosing malignancies of breast, Thyroid and parotid.
2. Lymphomas can be found out by FNAC but typing of lymphoma needs Excision biopsy.
3. Benign swelling of breast (Fibrodenoma), parotid (Pleomorphic Adenoma), Soft tissue (Lipoma) can be diagnosed with high accuracy by FNAC.
4. FNAC is useful in conjunction with clinical radiological findings to provide best possible initial assessment.
5. The diagnostic accuracy not only depends on representativeness of the aspirate but also on the quality of cytological preparation.
6. Repeat FNB samplings over a period of time reduces the false negative rates.

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Sl. No.	Name	Age/ Sex	IP No.	Unit	FNAC	
1.	Latha	18/F	870487	S5	Fibroadenoma	Fibroad
2.	Thaiyalnayaki	50/F	871189	S4	Infiltrating Intra Ductal Ca	Infiltrat
3.	Meena	16/F	871182	S4	Fibroadenoma	FA
4.	Janakiammal	60/F	869974		PTC	PTC
5.	Tamil Selvi	37/F	871410	S3	Nodular goiter	MNG
6.	Mukayee	51/F	869803	S3	IDC	Infiltrat
7.	Gomathy	30/F	14242		Nodular goiter	Hashim
8.	Jeyamary	47/F	871440	S3	IIDC	IIDCa
9.	Vellaiyammal	39/F	872641	S4	Nodular goiter	MNG
10.	Banumathy	35/F	76857	S4	Fibrocytic mastopathy	Suppera
11.	Renganayaki	60/F	872624	S4	Adenomatous goiter	Adenon microfo
12.	Shanthimalar	20/F	873077	S6	FA	FA
13.	Mahalakshmi	22/F	873195	S4	Nodule of Nodular Goitre	MNG
14.	Sivanandham	43/M	873205	S4	Folicular Neoplasm	MNG
15.	Latha	25/F	874166	S5	FA	FA
16.	Vairaselvi	27/F	873831	S5	Nodule of Nodular goiter	Nodule
17.	Viji	30/F	874504	S1	Fibroadenosis	Sclerosi
18.	Malarvizhi	35/F	873884	S5	Cystic degeneration in nodular goiter	MNG
19.	Kuppammal	45/F	875476	S4	Ductal ca	IIDC-N
20.	Indira	36/F	874218	S2	Colloid goiter	Simple
21.	Janaki	40/F	875245	S3	PCT	PCT

PTC – Papillary Thyroid Carcinoma ; MNG – Multi Nodular Goiter; FA – Fibroadenoma ; IDC-NOS - Intra Du
otherwise specified ; IIDC – Infiltrating Intraductual Carcinoma.

24.	Vijayalakshmi	21/F	875992	S2	FA	FA
25.	Anuradha	18/F	876301	S1	FA	Juvenile
26.	Viji	30/F	876235	S1	Fibroadenosis	IIDCA
27.	Sivabagyam	24/F	876319	S4	FA	Fibrocy
28.	Susheela	39/F	876606	S3	Colloid nodule	MNG
29.	Thiruvarul Selvi	30/F	876748	S1	FA	FA
30.	Ramamirtham	21/F	876761	S5	FA	Fibroad

31.	Sarasu	29/F	876304	S4	Nodular goiter	MNG
32.	Sathiba Begam	37/F	876969	S3	FA	Fibrocy
33.	Vijayalakshmi	55/F	131006	RT	Ductal Ca	IIDC
34.	Kawsalya	31/F	876318	S4	Nodular goiter	MNG
35.	Chidambaram	53/M	876461	S5	Nodular goiter	Hashim
36.	Lakshmi	30/F	877875	S3	FA	Fibrocy
37.	Viji	30/F	876235	S1	ADH	DCIS m
38.	Pakiri	70/M	877562	S4	IDC	IDC-NC
39.	Parimala	19/F	878660	S2	FA	FA
40.	Karthikeyini	47/F	876821	S5	Nodule of Nodular goiter	MNG
41.	Mariammal	35/F	876973	S3	PTC	PTC
42.	Anjammal	40/F	876945	S6	IDC	IDC
43.	Vasantha	40/F	877750	S2	FA	FA
44.	Amsavalli	30/F	876972	S3	PTC	PTC

ADH – Atypical Ductal Hyperplasia

47.	Jeenath Beevi	24/F	879072	S2	Fibroadenosis	Fibroad
48.	Manjula	35/F	879869	S4	FA	FA
49.	Kuppammal	40/F	879411	S4	IDC	IDC
50.	Logambal	55/F	876928	S6	Nodular goiter	MNG
51.	Dharmaraj	42/M	876949	S6	Nodular goiter	MNG
52.	Krishnambal	65/F	879512	S5	FA/ADH	Mucino
53.	Mary	33/F	880358	S2	FA	FA
54.	Revathy	37/F	879857	S1	IDC	IDC
55.	Fathima	47/F	878054	S1	Nodular goiter	Autoim
56.	Vasantha	29/F	880664	S4	Adenomatous goiter	MNG
57.	Papathy	45/F	880316	S5	IDC	IDC
58.	Kumudha	20/F	880950	S6	FA	FA
59.	Vedhavalli	35/F	880181	S4	Cystosarcoma Phyllodes tumour	Maligar
60.	Kalaiselvi	35/F	880797	S5	IDC	Medulla
61.	Ambika	45/F	881578	S2	FA	Benign
62.	Roja	48/F	881701	S3	IDC	IDC-NC
63.	Chitra	24/F	882627	S6	FA	FA
64.	Reka	24/F	882628	S8	FA	FA

65.	Shanthi	40/F	881872	S1	FA	FA
66.	Vembu	42/F	882483	S2	Colloid goiter	Simple (
67.	Shanthi	22/F	883815	S6	FA	FA
68.	Samanasa Mary	30/F	883829	S3	Fibroadenosis	FA
69.	Janaki	52/F	881496	S1	IDC	IDS-NC
70.	Malar	36/F	884371	S3	Phylloides tumour	Invasive
71.	Pattu	60/F	883160	S1	IDC	IDC-NC
72.	Jeyamani	40/F	884723	S6	IDC	IDC
73.	Saranya	18/F	885955	S2	FA	Fibroad
74.	Amsavalli	35/F	886317	S1	FA	FA
75.	Susheela	49/F	884150	S2	IDC	IDC-NC
76.	Yogabalmi	35/F	886635	S4	Nodular goiter	Hashim
77.	Ramya	13/F	887859	S2	FA	FA
78.	Janina Parveen	14/F	888160	S3	FA	FA
79.	Kavitha	25/F	887280	S5	Adenomatous goiter	Adenon
80.	Sudha	18/F	888683	S1	FA	Fibroad
81.	Santhya	17/F	888335	S5	FA	FA
82.	Rosi	18/F	888683	S1	FA	Fibroad
83.	Sahaya Mary	43/F	889370	S2	PCT	Nodule
84.	Senthamarai	60/F	888966	S3	IDC	IDC-NC
85.	Jasmine	19/F	889552	S1	FA	FA
86.	Vasantha	40/F	888872	S2	IDC	IDC-NC
87.	Visalatchi	45/F	900346	S1	IDC	IDC-NC
88.	Krishnaveni	20/F	900821	S2	FA	FA
89.	Selvi	24/F	900010	S2	IDC	IDC-NC
90.	Sellamari	23/F	901290	S1	Adenomatous goiter	MNG
91.	Malarvizhi	18/F	889257	S6	FA	FA
92.	Poongothai	24/F	888184	S4	Nodular Colloid goiter	Adenon
93.	Saranya	18/F	889518	S1	FA	FA
94.	Vijaya	37/F	889060	S5	PTC	PTC
95.	Sasikala	18/f	889945	S4	FA	FA
96.	Vasavi	18/F	890074	S2	FA	Fibrocy
97.	Sowharnisha	38/F	889947	S4	Nodular goiter	Nodule
98.	Anchammal	37/F	889960	S1	FA	FA
99.	Vellaiyammal	37/F	888852	S2	IDC	IDC-Hi
100.	Jothi	38/F	889935	S3	IDC	IDC

101.	Saritha	20/F	900116	S3	FA	FA
102.	Jeganathan	65/M	866203	S5	Mesenchymal Neoplasm	Malig. I
103.	Bhuvaneswari	24/F	867002	PS	Postauricular dermoid	Lymph
104.	Kasinathan	60/M	870722	S4	Lymphoproliferative disorder	HL
105.	Muthulakshmi	9/F	1009110		Reactive Aderitis	Reactiv
106.	Ramayee	40/F	870556	S3	Basal Cell Adenoma	Basal C
107.	Kumari	58/F	75911	S6	Mesenchymal Neoplasm	Malig M
108.	Pattammal	70/F	870015	S5	Mucoepidermoid Ca	High gr
109.	Jeyamary	56/F	871224	S6	Reactive hyperplasia	Reactiv
110.	Settu	40/M	871679	S5	Metastatic deposits	Meta SC
111.	Nallammal	35/F	872294	S5	Lipoma Both Axilla	Lipoma
112.	Vidivelli	45/F	873405	S5	Lipoma Both Axilla	Lipoma
113.	Rajangam	54/M	872901	MGE	HCC	Adenoc
114.	Mani	47/M	874504	S6	Dermoid Cyst	Calcifie

HL – Hodgkins Lymphoma; MPNST – Malignant Peripheral Nerve Sheath Tumour

116.	Bharathy	19/M	873221	S5	GCT-Seminoma	Embryo
117.	Mahalakshmi	25/F	873205	S3	Lymphoproliferative disorder	HL
118.	Sivaraman	42/M	874356	S6	Pleomorphic Ademona	Pleomo
119.	Karuppaiyan	59/M	873803	S2	Lipoma (Shoulder)	Lipoma
120.	Marimuthu	70/M	875561	S3	Pleomorphic Adenoma	Monom clear ce
121.	Shanmugapriya	25/F	875316	S2	Granulomatous Adenitis	Tubercu
122.	Logambal	70/F	876011	S5	Monomorphic Adenoma	Pleomo
123.	Anthoniammal	68/F	875880	S4	Lipoma (arm)	Lipoma
124.	Martin	39/M	876978	S3	Low grade MPNST	Low gra
125.	Jothi	48/F	876863	S2	Lipoma	Lipoma
126.	Malliga Begam	45/F	876967	S3	Reactive hyperplasia	Reactiv
127.	Gnanasoundar	8/M	79313	S6	Granulomatous Lymphadenitis	Caseati
128.	Bhuvaneswari	21/F	876064	S6	Pleomorphic Ademona	Pleomo
129.	Chaurichandran	15/M	877201	S1	HL	HL-Ly
130.	Arjunan	63/M	877321	S5	Metastatic deposits	Metasta
131.	Baby	18/F	877474	S6	Reactive hyperplasia	Caseati
132.	Govindaraj	43/M	877847	S6	Seminoma	Mixed-(

						& embr Nerosis
133.	Chandrasekaran	23/M	876790	S1	Pleomorphic Adenoma	Low gra
134.	Vadivel	60/M	878471	S4	Chronic sialadenitis	Chronic (Subma
135.	Chidambaram	48/M	878482	S4	Schwanoma	Schwan
136.	Wahitha Begam	32/F	878224	S2	Pleomorphic Adenoma	Low gra
137.	Thangavel	60/M	878978	S4	High grade mucoepidermoid ca	High gr
138.	Suba	35/F	879801	S5	Reactive Adenitis	TB Ade
139.	Jeyakumari	33/F	879989		Chronic Granulomatous adenitis	Tubercu
140.	Parthiban	35/M	87693		Pleomorphic Adenoma	Pleomo
141.	Parvathy	30/F	880293	S5	Chronic granulomatous Adenitis	Tubercu
142.	Chellammal	40/F	880187	S4	Metastatic Adenocarcinoma (Cervical Node)	Metasta
143.	Ramkumari	62/F	880592	S1	Pleomorphic Adenoma	Pleomo
144.	Nirmala	30/F	883329	S2	Chronic Sialadenitis	Chronic
145.	Parventhan	4/M	12112		Infected Cyst (Neck)	Bronchi
146.	Sarojini	28/F	884329	S6	Myoepithelial rich pleomor phic adenoma/Myoepithelioma	Acinic c
147.	Revathy	20/F	884197	S5	Lymphoproliferative disorder	HL
148.	Periasamy	29/F	884488	S1	Lymphoproliferative disorder	HL
149.	Manikandan	15/M	885844	S1	Low Gr.mucoepidermoid ca	Low gra
150.	Raja	26/M	992780	S6	TB Adenitis	TB Ade
151.	Velmurugan	35/M	901280	S1	Low grade mucoepidermoid ca	Low gra
152.	Sundarambal	45/F	889266	S2	Lymphoproliferative disorder	HL
153.	Selvakumar	18/M	889312	S4	Granulomatous Adenitis	TB Ade
154.	Vasuki	40/F	873025	S3	IDC	IDC-NC
155.	Rajalakshmi	35/F	889021	S5	Nodular goiter	Nodule

156.	Vallinayagam	45/F	901103	S4	IDC	IDC-NC
157.	Hathija Begam	40/F	908987	S4	Fibrocystic disease	IDC
158.	Ramakrishnan	18/M	881132	S1	Lymphoproliferative disorder	HL- Ly
159.	Vasantha	57/F	906285	S4	MFH	Sarcom
160.	Rani	27/F	846662	S5	Nodular goiter	MNG
161.	Baby	30/F	846677	S2	Nodule of Nodular goiter	MNG v Hemarr
162.	Amirthavalli	34/F	846382	S3	Phylloides tumour	Malign
163.	Vijayam	40.F	847488	S5	Nodule of Nodular goiter	MNG w
164.	Menaka	23/F	14752	S5	FA	Tubular
165.	Selvi	33/F	84844.	S6	IDC	IDC-NC
166.	Ponni	33/F	848114	S3	IDC	IDC-NC
167.	Ayyasami	40/M	847950	M1	Pleomorphic population of lymphocytes & scattered epitheloid cells	Caseati lympad
168.	Suganthi	17/F	848658	S4	FA	FA
169.	Kanimozhi	26/F	848672	S4	FA	Fibroad
170.	Muniyandi	58/M	848222	S4	Lymphoproliferative disorder	NHL
171.	Planivel	56/M	848477	S3	HL	HL-Ly variant
172.	Narayanasamy	55/M	848017	S2	Lipoma Neck	Lipoma
173.	Parvathy	27/F	848605	S5	PCT	MNG
174.	Pappathy	45/F	848345	S5	Adenomatous goiter	Adenon
175.	Chellappa	40/F	848946	S6	Lipoma	Lipoma
176.	Kala	25/F	849508	S4	Nodule of Nodular goiter	MNG
177.	Indirani	50/F	848724	S3	IDC	IDC wit
178.	Latha	19/F	851273	S4	FA	Fibroad
179.	Soundaraj	50/M	21345	S5	Lymphoproliferative Changes	NHL
180.	Manjula	25/F	850909	S2	FA	FA
181.	Ulaganathan	40/M	851031	S2	Lipoma- (cervical region)	Lipoma
182.	Sudha	18/F	850978	S6	FA	FA
183.	Suseela	40/F	851392		Fibrocystic disease, Atypical	FA

					Hyperplasia	
184.	Venkatachalam	53/M	878772	S2	Reactive Adenitis	HL-Lyn
185.	Selvi	24/F	852154	S4	Nodular goiter	MNG
186.	Rajendran	40/M	849875	S5	Lymphcyst Thyroid	PCT
187.	Anjalai	60/F	851375	S2	IDC	IDC-NC
188.	Amsadevi	35/F	851528	S3	IDC	IDC-NC
189.	Maruthayee	55/F	851420		Adenoma Thyroid	Follicul
190.	Nagammal	60/F	852172	S4	IDC	IDC-NC
191.	Kasiammal	55/F	851922	S3	IDC	IDC-NC
192.	Sakila Banu	16/F	855068	S6	FA	FA
193.	Viji	17/F	855065	S6	FA	FA
194.	Tamilselvi	30/F	853508	S6	IDC	IDC
195.	Pappa	30/F	852878	SI	Nodule of Nodular goiter	Adenon
196.	Rosali	50/F	852882	S1	Nodular goiter	MNG
197.	Muthukrishnan	29/M	8553945	S6	PCT	PCT
198.	Latha	24/F	855876	S3	FA	FA
199.	Silambuselvi	30/F	855934		IDC	IDC
200.	Sathiya	30/M		RT	Pleomorphic MFH	Pleomo

NHL – Non Hodgkins Lymphoma